

**Final  
Site-Specific Field Sampling Plan Addendum**

**Remedial Investigation  
Former Chemical Laundry and  
Motor Pool Area 1500, Parcel 94(7)**

**Fort McClellan  
Calhoun County, Alabama**

**Prepared for:**

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**Revision 1**

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## ***List of Acronyms***

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See Attachment 1, List of Abbreviations and Acronyms

## 1.0 Introduction

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The Former Chemical Laundry and Motor Pool Area 1500, Parcel 94(7) (Figure 1-1) was identified as an area to be investigated prior to property transfer. The site was identified as a Category 7 site in the environmental baseline survey (Environmental Science and Engineering, 1998). Category 7 sites are areas that are not evaluated and/or require further evaluation. A site-specific field sampling plan (SFSP) attachment and a site-specific safety and health plan (SSHP) attachment were finalized in October, 1998 (IT Corporation [IT], 1998a) to address field activities associated with the site investigation (SI). The SI included a geophysical survey and field work to collect six surface soil samples, twelve subsurface soil samples, five groundwater samples, two surface water samples, two sediment samples, and four depositional soil samples. The SI was performed to determine whether potential site-specific chemicals were present at concentrations that would present an unacceptable risk to human health or the environment. The SI analytical results were compared to human health site-specific screening levels (SSSL), ecological screening values (ESV), and background screening values for Fort McClellan (FTMC). The SSSLs and ESVs were compiled by IT as part of the human health and ecological risk evaluations associated with SIs being conducted under the base realignment and closure (BRAC) environmental restoration program at FTMC. Based on the comparisons of the analytical data to the SSSLs, a remedial investigation (RI) is required to determine the horizontal and vertical extent of groundwater contamination.

This addendum to the SFSP attachment will be used in conjunction with the SSHP, the installation-wide work plan (IT, 1998b), and installation-wide sampling and analysis plan (SAP) (IT, 2000). The SAP includes the installation-wide safety and health plan, waste management plan, and quality assurance plan. Site-specific hazard analyses are included in the SSHP.

This addendum to the SFSP attachment for FTMC has been prepared to provide technical guidance and rationale for sample collection and analysis at the Former Chemical Laundry and Motor Pool Area 1500, Parcel 94(7) (Figure 1-1). IT will collect samples at this site as part of a RI effort. The purpose of the RI is to define the horizontal and vertical extent of chlorinated compounds, specifically trichloroethene (TCE) and vinyl chloride, in groundwater. The proposed RI field activities are based on the discussions and site visit May 10, 2000 with the Alabama Department of Environmental Management, U.S. Environmental Protection Agency, Region IV, and the U.S. Army Corps of Engineers, Mobile District.



## **2.0 Summary of Site Investigations**

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This section summarizes the SI activities conducted by IT at the Former Chemical Laundry and Motor Pool Area 1500, Parcel 94(7), including the surface geophysical survey, environmental sampling and analysis, and monitoring well installation activities.

### **2.1 Geophysical Survey**

A geophysical survey utilizing magnetic, electromagnetic, and ground penetrating radar methods, was conducted at the Former Chemical Laundry and Motor Pool Area 1500, Parcel 94(7) to locate any existing underground storage tanks at the site. The area surveyed was approximately 216,700 square feet (5 acres), and includes the shaded area on the sample location map (Figure 2-1). A detailed discussion of the geophysical investigation, including theory of operation of the instruments, field procedures, data processing, and interpreted results of the investigation will be presented in the RI report.

### **2.2 Environmental Sampling**

The environmental sampling performed during the SI at the Former Chemical Laundry and Motor Pool Area 1500, Parcel 94(7) included the collection of surface and depositional soil samples, subsurface soil samples, groundwater samples, surface water samples, and sediment samples for chemical analysis. The sample locations were determined by the on-site geologist based on the sampling rationale, surface geophysical survey results, presence of surface structures, site topography, buried and overhead utilities, observing site physical characteristics noted during a site walkover, and by reviewing historical documents pertaining to activities conducted at the site. Analytical results were compared to residential human health SSSLs, ESVs, and background screening values (metals, volatile organic compounds [VOC], and semivolatile organic compounds [SVOC]), as presented in Tables 2-1 through 2-3. Sample locations are presented on Figure 2-1. Sample locations exceeding the SSSLs are presented on Figure 2-2.

#### **2.2.1 Surface and Depositional Soil Sampling**

Six surface soil samples and four depositional soil samples were collected for chemical analysis at the Former Chemical Laundry and Motor Pool Area 1500, Parcel 94(7). Surface and depositional soil samples were collected from the upper 1 foot of soil at the locations shown on Figure 2-1. As shown on Table 2-1, two metals and five SVOCs exceeded the SSSLs and

Table 2-1

**Surface and Depositional Soil Analytical Results**  
**Remedial Investigation**  
**Former Chemical Laundry and Motor Pool Area 1500, Parcel 94(7)**  
**Fort McClellan, Calhoun County, Alabama**

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Parcel					FTA-94-DEP01					FTA-94-DEP02					FTA-94-DEP03				
Sample Location					FTA-94					FTA-94					FTA-94				
Sample Number					EM0021					EM0022					EM0023				
Sample Date					11-Nov-98					11-Nov-98					11-Nov-98				
Sample Depth (Feet)					0-1					0-1					0-1				
Parameter	Units	BKG <sup>a</sup>	SSS <sup>b</sup> L	ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
<b>METALS</b>																			
Aluminum	mg/kg	1.63E+04	7.80E+03	5.00E+01	7.57E+03				YES	6.88E+03				YES	5.68E+03				YES
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01	5.40E+00		YES			6.00E+00			YES		7.20E+00			YES	
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02	6.48E+01					1.17E+02					1.06E+02				
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00	ND					1.00E+00		YES			1.20E+00		YES		YES
Calcium	mg/kg	1.72E+03			5.37E+03		YES			1.28E+03					2.79E+03		YES		
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	1.67E+01				YES	1.70E+01				YES	2.38E+01			YES	YES
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01	1.02E+01					1.26E+01					1.23E+01				
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	2.39E+01		YES			3.05E+01		YES			3.64E+01		YES		
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	1.97E+04			YES	YES	2.43E+04			YES	YES	2.94E+04			YES	YES
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01	4.79E+01		YES			3.95E+01					7.80E+01		YES		YES
Magnesium	mg/kg	1.03E+03		4.40E+05	1.51E+03		YES			ND					ND				
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02	2.73E+02			YES		4.69E+02			YES	YES	7.15E+02			YES	YES
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01	1.10E-01		YES		YES	9.90E-02		YES			1.10E-01		YES		YES
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01	1.22E+01		YES			8.90E+00					9.30E+00				
Potassium	mg/kg	8.00E+02			ND					ND					ND				
Selenium	mg/kg	4.80E-01	3.91E+01	8.10E-01	1.40E+00		YES		YES	1.40E+00		YES		YES	1.70E+00		YES		YES
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	1.28E+01				YES	1.16E+01				YES	1.11E+01				YES
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	1.53E+02		YES		YES	5.63E+01		YES		YES	8.69E+01		YES		YES
<b>SEMIVOLATILE ORGANIC COMPOUNDS</b>																			
2-Methylnaphthalene	mg/kg		1.55E+02		ND					ND					ND				
Acenaphthene	mg/kg	7.02E-01	4.63E+02	2.00E+01	7.10E-02	J				ND					ND				
Acenaphthylene	mg/kg	8.91E-01	4.63E+02	6.82E+02	5.20E-01	J				8.60E-02	J				ND				
Anthracene	mg/kg	9.35E-01	2.33E+03	1.00E-01	7.20E-01				YES	9.20E-02	J				ND				
Benzo(a)anthracene	mg/kg	1.19E+00	8.51E-01	5.21E+00	3.20E+00		YES	YES		1.70E-01	J				ND				
Benzo(a)pyrene	mg/kg	1.42E+00	8.51E-02	1.00E-01	4.60E+00		YES	YES	YES	2.30E-01	J		YES	YES	4.90E-02	J			
Benzo(b)fluoranthene	mg/kg	1.66E+00	8.51E-01	5.98E+01	7.20E+00		YES	YES		2.30E-01	J				7.10E-02	J			
Benzo(ghi)perylene	mg/kg	9.55E-01	2.32E+02	1.19E+02	1.70E+00		YES			1.10E-01	J				ND				
Benzo(k)fluoranthene	mg/kg	1.45E+00	8.51E+00	1.48E+02	4.40E+00		YES			2.80E-01	J				5.70E-02	J			
Carbazole	mg/kg		3.11E+01		7.00E-01					5.40E-02	J				ND				
Chrysene	mg/kg	1.40E+00	8.61E+01	4.73E+00	5.00E+00		YES		YES	2.30E-01	J				5.40E-02	J			
Dibenz(a,h)anthracene	mg/kg	7.20E-01	8.61E-02	1.84E+01	9.10E-01		YES	YES		6.00E-02	J				ND				
Dibenzofuran	mg/kg		3.09E+01		ND					ND					ND				
Fluoranthene	mg/kg	2.03E+00	3.09E+02	1.00E-01	8.00E+00		YES		YES	4.40E-01				YES	6.70E-02	J			
Fluorene	mg/kg	6.67E-01	3.09E+02	1.22E+02	1.10E-01	J				ND					ND				
Indeno(1,2,3-cd)pyrene	mg/kg	9.37E-01	8.51E-01	1.09E+02	2.00E+00		YES	YES		1.20E-01	J				ND				
Naphthalene	mg/kg	3.30E-02	1.55E+02	1.00E-01	ND					ND					ND				
Phenanthrene	mg/kg	1.08E+00	2.32E+03	1.00E-01	1.80E+00		YES		YES	2.00E-01	J			YES	ND				
Pyrene	mg/kg	1.63E+00	2.33E+02	1.00E-01	5.90E+00		YES		YES	3.10E-01	J			YES	5.30E-02	J			
bis(2-Ethylhexyl)phthalate	mg/kg		4.52E+01	9.30E-01	ND					ND					ND				



Table 2-1

**Surface and Depositional Soil Analytical Results**  
**Remedial Investigation**  
**Former Chemical Laundry and Motor Pool Area 1500, Parcel 94(7)**  
**Fort McClellan, Calhoun County, Alabama**

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Parcel					FTA-94-DEP01					FTA-94-DEP02					FTA-94-DEP03				
Sample Location					FTA-94					FTA-94					FTA-94				
Sample Number					EM0021					EM0022					EM0023				
Sample Date					11-Nov-98					11-Nov-98					11-Nov-98				
Sample Depth (Feet)					0- 1					0- 1					0- 1				
Parameter	Units	BKG <sup>a</sup>	SSS <sup>b</sup> L	ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
<b>VOLATILE ORGANIC COMPOUNDS</b>																			
1,2,4-Trimethylbenzene	mg/kg		3.88E+02	1.00E-01	ND					ND					ND				
1,2-Dimethylbenzene	mg/kg		1.55E+04	5.00E-02	ND					ND					ND				
1,3,5-Trimethylbenzene	mg/kg		3.88E+02	1.00E-01	ND					ND					ND				
2-Butanone	mg/kg		4.66E+03	8.96E+01	7.50E-03	B				7.70E-03	B				1.90E-02	B			
Acetone	mg/kg		7.76E+02	2.50E+00	1.80E-01	J				1.10E-01	J				3.20E-01	J			
Bromomethane	mg/kg		1.09E+01		ND					ND					ND				
Carbon disulfide	mg/kg		7.77E+02	9.00E-02	ND					ND					ND				
Methylene chloride	mg/kg		8.41E+01	2.00E+00	8.40E-03	B				5.20E-03	B				5.30E-03	B			
Naphthalene	mg/kg	3.30E-02	1.55E+02	1.00E-01	ND					ND					ND				
Toluene	mg/kg		1.55E+03	5.00E-02	2.80E-03	J				ND					ND				
cis-1,2-Dichloroethene	mg/kg		7.77E+01	1.00E-01	ND					ND					ND				
m,p-Xylenes	mg/kg		1.55E+04	5.00E-02	ND					ND					ND				
p-Cymene	mg/kg		1.55E+03		2.40E-02	J				ND					ND				

Table 2-1

**Surface and Depositional Soil Analytical Results**  
**Remedial Investigation**  
**Former Chemical Laundry and Motor Pool Area 1500, Parcel 94(7)**  
**Fort McClellan, Calhoun County, Alabama**

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Parcel		FTA-94-DEP04					FTA-94-GP01					FTA-94-GP02					FTA-94-GP05				
Sample Location		FTA-94					FTA-94					FTA-94					FTA-94				
Sample Number		EM0024					EM0001					EM0003					EM0009				
Sample Date		11-Nov-98					16-Oct-98					16-Oct-98					27-Oct-98				
Sample Depth (Feet)		0- 1					0- 1					0- 1					0- 1				
Parameter	Units	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
<b>METALS</b>																					
Aluminum	mg/kg	2.61E+03				YES	8.04E+03			YES	YES	1.02E+04			YES	YES	1.20E+04			YES	YES
Arsenic	mg/kg	3.10E+00			YES		3.50E+00			YES		6.20E+00			YES		1.04E+01			YES	YES
Barium	mg/kg	3.05E+01					9.45E+01					5.70E+01					6.73E+01				
Beryllium	mg/kg	ND					1.20E+00		YES		YES	8.60E-01		YES			ND				
Calcium	mg/kg	6.75E+02					6.67E+03		YES			1.56E+04		YES			1.63E+03				
Chromium	mg/kg	2.44E+01			YES	YES	2.52E+01			YES	YES	2.31E+01				YES	3.18E+01			YES	YES
Cobalt	mg/kg	8.40E+00					1.82E+01		YES			ND					2.66E+01		YES		YES
Copper	mg/kg	6.00E+00					2.07E+01		YES			1.69E+01		YES			4.12E+01		YES		YES
Iron	mg/kg	1.55E+04			YES	YES	2.75E+04			YES	YES	2.73E+04			YES	YES	3.99E+04		YES	YES	YES
Lead	mg/kg	1.72E+01					2.00E+01	J				1.18E+01	J				1.66E+01				
Magnesium	mg/kg	ND					1.58E+03		YES			2.94E+03		YES			ND				
Manganese	mg/kg	5.16E+02			YES	YES	1.60E+03		YES	YES	YES	2.22E+02				YES	1.38E+02				YES
Mercury	mg/kg	ND					1.20E-01		YES		YES	ND					1.30E-01		YES		YES
Nickel	mg/kg	ND					9.80E+00					1.08E+01		YES			8.30E+00				
Potassium	mg/kg	ND					ND					8.50E+02		YES			ND				
Selenium	mg/kg	ND					7.90E-01		YES			1.40E+00		YES		YES	2.80E+00		YES		YES
Vanadium	mg/kg	ND					1.03E+01				YES	1.97E+01				YES	2.57E+01				YES
Zinc	mg/kg	7.13E+01		YES		YES	3.35E+01					1.99E+01	B				4.01E+01				
<b>SEMIVOLATILE ORGANIC COMPOUNDS</b>																					
2-Methylnaphthalene	mg/kg	ND					ND					6.30E-01	J				ND				
Acenaphthene	mg/kg	ND					6.20E-02	J				1.40E+00	J	YES			ND				
Acenaphthylene	mg/kg	1.10E-01	J				1.90E-01	J				2.30E+00	J	YES			ND				
Anthracene	mg/kg	1.20E-01	J			YES	3.90E-01	J			YES	5.60E+00		YES		YES	ND				
Benzo(a)anthracene	mg/kg	2.70E-01	J				9.70E-01			YES		6.50E+00		YES	YES	YES	ND				
Benzo(a)pyrene	mg/kg	3.60E-01	J		YES	YES	7.30E-01			YES	YES	5.30E+00		YES	YES	YES	3.50E-02	J			
Benzo(b)fluoranthene	mg/kg	4.50E-01					1.10E+00			YES		4.30E+00		YES	YES		ND				
Benzo(ghi)perylene	mg/kg	1.70E-01	J				2.80E-01	J				1.60E+00	J	YES			ND				
Benzo(k)fluoranthene	mg/kg	3.80E-01					6.70E-01					6.50E+00	J	YES			ND				
Carbazole	mg/kg	8.10E-02	J				2.50E-01	J				3.00E+00	J				ND				
Chrysene	mg/kg	3.80E-01					9.30E-01					6.10E+00		YES		YES	ND				
Dibenz(a,h)anthracene	mg/kg	8.60E-02	J				1.90E-01	J		YES		1.00E+00	J	YES	YES		ND				
Dibenzofuran	mg/kg	ND					7.20E-02	J				2.00E+00	J				ND				
Fluoranthene	mg/kg	6.60E-01			YES		2.00E+00				YES	2.00E+01		YES		YES	ND				
Fluorene	mg/kg	ND					2.20E-01	J				5.20E+00		YES			ND				
Indeno(1,2,3-cd)pyrene	mg/kg	1.80E-01	J				3.40E-01	J				1.90E+00	J	YES	YES		ND				
Naphthalene	mg/kg	ND					ND					ND					ND				
Phenanthrene	mg/kg	2.20E-01	J			YES	8.40E-01				YES	1.80E+01		YES		YES	ND				
Pyrene	mg/kg	4.90E-01			YES		1.70E+00		YES		YES	1.40E+01		YES		YES	ND				
bis(2-Ethylhexyl)phthalate	mg/kg	ND					ND					ND					1.20E-01	J			

Table 2-1

**Surface and Depositional Soil Analytical Results**  
**Remedial Investigation**  
**Former Chemical Laundry and Motor Pool Area 1500, Parcel 94(7)**  
**Fort McClellan, Calhoun County, Alabama**

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Parcel		FTA-94-DEP04					FTA-94-GP01					FTA-94-GP02					FTA-94-GP05				
Sample Location		FTA-94					FTA-94					FTA-94					FTA-94				
Sample Number		EM0024					EM0001					EM0003					EM0009				
Sample Date		11-Nov-98					16-Oct-98					16-Oct-98					27-Oct-98				
Sample Depth (Feet)		0- 1					0- 1					0- 1					0- 1				
Parameter	Units	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
<b>VOLATILE ORGANIC COMPOUNDS</b>																					
1,2,4-Trimethylbenzene	mg/kg	ND					ND					2.90E-02	J				ND				
1,2-Dimethylbenzene	mg/kg	ND					ND					2.50E-03	J				ND				
1,3,5-Trimethylbenzene	mg/kg	ND					ND					6.80E-03	J				ND				
2-Butanone	mg/kg	ND					3.00E-02					8.60E-03	J				ND				
Acetone	mg/kg	3.60E-02	J				2.30E-01	J				1.70E-01	J				2.80E-02	B			
Bromomethane	mg/kg	ND					ND					ND					1.40E-03	B			
Carbon disulfide	mg/kg	ND					1.40E-02					1.50E-02					3.70E-03	J			
Methylene chloride	mg/kg	3.40E-03	B				3.50E-03	B				3.30E-03	B				4.20E-03	B			
Naphthalene	mg/kg	ND					4.40E-03	J				2.70E-02	J				ND				
Toluene	mg/kg	ND					ND					ND					ND				
cis-1,2-Dichloroethene	mg/kg	ND					ND					ND					4.60E-03	J			
m,p-Xylenes	mg/kg	ND					ND					4.50E-03	J				ND				
p-Cymene	mg/kg	4.30E-03	J				ND					ND					ND				

Table 2-1

**Surface and Depositional Soil Analytical Results**  
**Remedial Investigation**  
**Former Chemical Laundry and Motor Pool Area 1500, Parcel 94(7)**  
**Fort McClellan, Calhoun County, Alabama**

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Parcel		FTA-94-GP08					FTA-94-GP11					FTA-94-GP12				
Sample Location		FTA-94					FTA-94					FTA-94				
Sample Number		EM0013					EM0017					EM0019				
Sample Date		27-Oct-98					21-Oct-98					21-Oct-98				
Sample Depth (Feet)		0- 1					0- 1					0- 1				
Parameter	Units	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
<b>METALS</b>																
Aluminum	mg/kg	1.08E+04			YES	YES	7.98E+03			YES	YES	5.78E+03				YES
Arsenic	mg/kg	5.60E+00			YES		4.80E+00			YES		2.00E+00			YES	
Barium	mg/kg	5.09E+01					5.68E+01					4.03E+01				
Beryllium	mg/kg	ND					8.90E-01		YES			ND				
Calcium	mg/kg	6.03E+02					1.88E+03		YES			8.05E+03		YES		
Chromium	mg/kg	2.22E+01				YES	2.56E+01			YES	YES	1.53E+01				YES
Cobalt	mg/kg	8.60E+00					6.50E+00					ND				
Copper	mg/kg	2.35E+01		YES			2.97E+01		YES			3.60E+00				
Iron	mg/kg	3.50E+04		YES	YES	YES	2.62E+04			YES	YES	6.73E+03			YES	YES
Lead	mg/kg	1.36E+01					2.17E+01	J				6.50E+00	J			
Magnesium	mg/kg	6.01E+02					ND					1.52E+03		YES		
Manganese	mg/kg	8.88E+01					1.75E+02			YES		2.86E+02				YES
Mercury	mg/kg	8.90E-02		YES			ND					ND				
Nickel	mg/kg	8.40E+00					6.90E+00					5.00E+00	B			
Potassium	mg/kg	6.21E+02	B				6.37E+02					ND				
Selenium	mg/kg	1.70E+00		YES		YES	1.40E+00		YES		YES	ND				
Vanadium	mg/kg	6.90E+00				YES	6.20E+00				YES	1.12E+01				YES
Zinc	mg/kg	2.95E+01	B				3.30E+01					6.40E+00	B			
<b>SEMIVOLATILE ORGANIC COMPOUNDS</b>																
2-Methylnaphthalene	mg/kg	ND					1.30E-01	J				ND				
Acenaphthene	mg/kg	ND					9.80E-02	J				ND				
Acenaphthylene	mg/kg	ND					1.30E+00		YES			4.30E-01				
Anthracene	mg/kg	ND					8.90E-01				YES	2.90E-01	J			YES
Benzo(a)anthracene	mg/kg	ND					9.00E-01			YES		8.50E-01				
Benzo(a)pyrene	mg/kg	ND					3.80E+00		YES	YES	YES	1.10E+00			YES	YES
Benzo(b)fluoranthene	mg/kg	ND					3.60E+00		YES	YES		1.20E+00			YES	
Benzo(ghi)perylene	mg/kg	ND					8.70E-01					2.90E-01	J			
Benzo(k)fluoranthene	mg/kg	ND					3.30E+00	J	YES			1.30E+00	J			
Carbazole	mg/kg	ND					2.40E-01	J				1.50E-01	J			
Chrysene	mg/kg	ND					1.20E+00					1.00E+00				
Dibenz(a,h)anthracene	mg/kg	ND					5.50E-01			YES		1.60E-01	J		YES	
Dibenzofuran	mg/kg	ND					9.40E-02	J				ND				
Fluoranthene	mg/kg	ND					2.00E+00				YES	2.20E+00		YES		YES
Fluorene	mg/kg	ND					2.60E-01	J				ND				
Indeno(1,2,3-cd)pyrene	mg/kg	ND					1.10E+00		YES	YES		3.10E-01	J			
Naphthalene	mg/kg	ND					2.50E-01	J	YES		YES	ND				
Phenanthrene	mg/kg	ND					7.20E-01				YES	3.30E-01	J			YES
Pyrene	mg/kg	ND					2.10E+00		YES		YES	2.10E+00		YES		YES
bis(2-Ethylhexyl)phthalate	mg/kg	ND					7.70E-02	B				9.20E-02	B			

Table 2-1

**Surface and Depositional Soil Analytical Results**  
**Remedial Investigation**  
**Former Chemical Laundry and Motor Pool Area 1500, Parcel 94(7)**  
**Fort McClellan, Calhoun County, Alabama**

(Page 6 of 7)

Parcel		FTA-94-GP08					FTA-94-GP11					FTA-94-GP12				
Sample Location		FTA-94					FTA-94					FTA-94				
Sample Number		EM0013					EM0017					EM0019				
Sample Date		27-Oct-98					21-Oct-98					21-Oct-98				
Sample Depth (Feet)		0- 1					0- 1					0- 1				
Parameter	Units	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
<b>VOLATILE ORGANIC COMPOUNDS</b>																
1,2,4-Trimethylbenzene	mg/kg	ND					1.20E-02	J				ND				
1,2-Dimethylbenzene	mg/kg	ND					ND					ND				
1,3,5-Trimethylbenzene	mg/kg	ND					ND					ND				
2-Butanone	mg/kg	ND					2.20E-02	J				ND				
Acetone	mg/kg	6.00E-02	J				2.00E-01	J				2.70E-01	J			
Bromomethane	mg/kg	ND					ND					ND				
Carbon disulfide	mg/kg	ND					1.20E-02					1.20E-02				
Methylene chloride	mg/kg	4.90E-03	B				9.70E-03	B				5.40E-03	B			
Naphthalene	mg/kg	ND					4.30E-02	J	YES			2.40E-03	J			
Toluene	mg/kg	ND					ND					ND				
cis-1,2-Dichloroethene	mg/kg	ND					ND					ND				
m,p-Xylenes	mg/kg	ND					ND					ND				
p-Cymene	mg/kg	ND					3.50E-03	J				ND				

**Table 2-1**

**Surface and Depositional Soil Analytical Results  
Former Chemical Laundry and Motor Pool Area 1500, Parcel 94(7)  
Fort McClellan, Calhoun County, Alabama**

(Page 7 of 7)

Analyses performed by Quanterra Environmental Services using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods, including Update III methods where applicable.

<sup>a</sup> Background. Concentration listed is two times the arithmetic mean of background metals concentration given in Science Applications International Corporation (1998), *Final Background Metals Survey Report*, Fort McClellan, Alabama, July.

<sup>b</sup> Residential human health site-specific screening level (SSSL) and ecological screening value (ESV) as given in IT Corporation (2000) *Final Human Health and Ecological Screening Values and PAH Background Summary Report*, Fort McClellan, Calhoun County, Alabama, March.

B - Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero).

J - Result is greater than stated method detection limit but less than or equal to specified reporting limit.

mg/kg - Milligrams per kilogram

ND - Not detected

Qual - Data validation qualifier

Table 2-2

**Subsurface Soil Analytical Results**  
**Remedial Investigation**  
**Former Chemical Laundry and Motor Pool Area 1500, Parcel 94(7)**  
**Fort McClellan, Calhoun County, Alabama**

(Page 1 of 7)

Parcel				FTA-94-GP01				FTA-94-GP02				FTA-94-GP03				FTA-94-GP04			
Sample Location				FTA-94				FTA-94				FTA-94				FTA-94			
Sample Number				EM0002				EM0004				EM0007				EM0008			
Sample Date				16-Oct-98				16-Oct-98				21-Oct-98				21-Oct-98			
Sample Depth (Feet)				5-8				1-5				0 - 4				8-12			
Parameter	Units	BKG <sup>a</sup>	SSSL <sup>b</sup>	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL
<b>METALS</b>																			
Aluminum	mg/kg	1.36E+04	7.80E+03	1.61E+04		YES	YES	1.86E+04		YES	YES	9.47E+03			YES	1.21E+04			YES
Arsenic	mg/kg	1.83E+01	4.26E-01	4.90E+00			YES	6.30E+00			YES	1.09E+01			YES	6.30E+00			YES
Barium	mg/kg	2.34E+02	5.47E+02	1.16E+02				4.90E+01				ND				2.81E+01			
Beryllium	mg/kg	8.60E-01	9.60E+00	1.40E+00		YES		1.40E+00		YES		7.30E-01				1.30E+00		YES	
Calcium	mg/kg	6.37E+02		7.30E+02		YES		ND				ND				1.46E+03		YES	
Chromium	mg/kg	3.83E+01	2.32E+01	2.50E+01			YES	2.66E+01			YES	2.81E+01			YES	2.58E+01			YES
Cobalt	mg/kg	1.75E+01	4.68E+02	2.09E+01		YES		2.55E+01		YES		6.20E+00				2.54E+01		YES	
Copper	mg/kg	1.94E+01	3.13E+02	4.50E+01		YES		5.42E+01		YES		3.95E+01		YES		6.27E+01		YES	
Iron	mg/kg	4.48E+04	2.34E+03	3.60E+04			YES	3.98E+04			YES	4.87E+04		YES	YES	3.85E+04			YES
Lead	mg/kg	3.85E+01	4.00E+02	1.62E+01	J			2.06E+01	J			1.96E+01	J			2.85E+01	J		
Magnesium	mg/kg	7.66E+02		6.13E+03		YES		5.97E+03		YES		ND				ND			
Manganese	mg/kg	1.36E+03	3.63E+02	1.30E+02				2.86E+02				1.23E+01				1.63E+02			
Mercury	mg/kg	7.00E-02	2.33E+00	ND				4.60E-02				ND				5.30E-02			
Nickel	mg/kg	1.29E+01	1.54E+02	3.75E+01		YES		4.34E+01		YES		5.60E+00	B			1.68E+01		YES	
Potassium	mg/kg	7.11E+02		7.76E+02		YES		8.97E+02		YES		6.61E+02				8.69E+02		YES	
Selenium	mg/kg	4.70E-01	3.91E+01	8.60E-01		YES		1.20E+00		YES		3.50E+00		YES		1.70E+00		YES	
Vanadium	mg/kg	6.49E+01	5.31E+01	ND				ND				1.88E+01				ND			
Zinc	mg/kg	3.49E+01	2.34E+03	1.20E+02		YES		1.19E+02		YES		3.18E+01				8.92E+01		YES	
<b>POLYCHLORINATED BIPHENYLS</b>																			
Aroclor 1254	mg/kg		2.93E-01	ND				ND				ND				7.70E-02			
Aroclor 1260	mg/kg		2.93E-01	ND				ND				ND				1.30E-01			
<b>SEMIVOLATILE ORGANIC COMPOUNDS</b>																			
Acenaphthylene	mg/kg		4.63E+02	ND				ND				ND				7.20E-02	J		
Benzo(a)anthracene	mg/kg		8.51E-01	ND				ND				ND				6.70E-02	J		
Benzo(a)pyrene	mg/kg		8.51E-02	ND				ND				ND				1.60E-01	J		YES
Benzo(b)fluoranthene	mg/kg		8.51E-01	ND				ND				ND				1.30E-01	J		
Benzo(ghi)perylene	mg/kg		2.32E+02	ND				ND				ND				1.40E-01	J		
Benzo(k)fluoranthene	mg/kg		8.51E+00	ND				ND				ND				1.70E-01	J		
Chrysene	mg/kg		8.61E+01	ND				ND				ND				8.50E-02	J		
Dibenz(a,h)anthracene	mg/kg		8.61E-02	ND				ND				ND				4.80E-02	J		
Fluoranthene	mg/kg		3.09E+02	ND				ND				ND				6.90E-02	J		
Indeno(1,2,3-cd)pyrene	mg/kg		8.51E-01	ND				ND				ND				1.10E-01	J		
Pyrene	mg/kg		2.33E+02	ND				ND				ND				9.30E-02	J		
bis(2-Ethylhexyl)phthalate	mg/kg		4.52E+01	ND				ND				ND				7.10E-02	B		

Table 2-2

**Subsurface Soil Analytical Results**  
**Remedial Investigation**  
**Former Chemical Laundry and Motor Pool Area 1500, Parcel 94(7)**  
**Fort McClellan, Calhoun County, Alabama**

(Page 2 of 7)

Parcel				FTA-94-GP01				FTA-94-GP02				FTA-94-GP03				FTA-94-GP04			
Sample Location				FTA-94				FTA-94				FTA-94				FTA-94			
Sample Number				EM0002				EM0004				EM0007				EM0008			
Sample Date				16-Oct-98				16-Oct-98				21-Oct-98				21-Oct-98			
Sample Depth (Feet)				5-8				1-5				0 - 4				8-12			
Parameter	Units	BKG <sup>a</sup>	SSSL <sup>b</sup>	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL
<b>VOLATILE ORGANIC COMPOUNDS</b>																			
1,1,2,2-Tetrachloroethane	mg/kg		3.13E+00	ND				ND				ND				ND			
1,2,4-Trimethylbenzene	mg/kg		3.88E+02	ND				ND				ND				ND			
1,2-Dimethylbenzene	mg/kg		1.55E+04	ND				ND				ND				ND			
1,3,5-Trimethylbenzene	mg/kg		3.88E+02	ND				ND				ND				ND			
2-Butanone	mg/kg		4.66E+03	ND				ND				ND				ND			
Acetone	mg/kg		7.76E+02	1.50E-02	B			1.50E-02	B			1.70E-02	B			2.20E-02	B		
Ethylbenzene	mg/kg		7.77E+02	ND				ND				ND				ND			
Methylene chloride	mg/kg		8.41E+01	2.70E-03	B			3.10E-03	B			9.60E-03	B			8.60E-03	B		
Toluene	mg/kg		1.55E+03	ND				ND				ND				ND			
Trichloroethene	mg/kg		5.72E+01	ND				ND				ND				ND			
m,p-Xylenes	mg/kg		1.55E+04	ND				ND				ND				ND			
n-Propylbenzene	mg/kg		7.77E+01	ND				ND				ND				ND			
p-Cymene	mg/kg		1.55E+03	ND				ND				ND				ND			



Table 2-2

**Subsurface Soil Analytical Results**  
**Remedial Investigation**  
**Former Chemical Laundry and Motor Pool Area 1500, Parcel 94(7)**  
**Fort McClellan, Calhoun County, Alabama**

(Page 3 of 7)

Parcel		FTA-94-GP05				FTA-94-GP06				FTA-94-GP07				FTA-94-GP08				FTA-94-GP09			
Sample Location		FTA-94				FTA-94				FTA-94				FTA-94				FTA-94			
Sample Number		EM0010				EM0011				EM0012				EM0014				EM0015			
Sample Date		27-Oct-98				21-Oct-98				21-Oct-98				27-Oct-98				21-Oct-98			
Sample Depth (Feet)		24 - 28				8-11				1-4				7-9				8-12			
Parameter	Units	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL
<b>METALS</b>																					
Aluminum	mg/kg	6.60E+03				8.27E+03			YES	6.98E+03				1.09E+04			YES	9.69E+03			
Arsenic	mg/kg	1.06E+01			YES	8.50E+00			YES	7.20E+00			YES	1.31E+01			YES	1.31E+01			
Barium	mg/kg	6.62E+01				ND				6.56E+01				2.31E+01				3.25E+01			
Beryllium	mg/kg	1.60E+00		YES		ND				ND				ND				5.70E-01			
Calcium	mg/kg	3.66E+03		YES		ND				6.11E+02				6.03E+02				ND			
Chromium	mg/kg	1.12E+01				1.71E+01				2.26E+01				3.35E+01			YES	2.41E+01			
Cobalt	mg/kg	1.36E+01				8.10E+00				1.03E+01				7.20E+00				1.28E+01			
Copper	mg/kg	1.69E+01				1.06E+01				9.50E+00				1.89E+01				1.76E+01			
Iron	mg/kg	2.51E+04			YES	3.28E+04			YES	3.18E+04			YES	4.66E+04		YES	YES	3.80E+04			
Lead	mg/kg	1.70E+01				8.80E+00	J			2.19E+01	J			1.17E+01				1.51E+01	J		
Magnesium	mg/kg	ND				ND				ND				ND				ND			
Manganese	mg/kg	6.12E+02			YES	7.55E+01				3.57E+02				1.84E+02				8.70E+02			
Mercury	mg/kg	1.30E-01		YES		4.10E-02				6.00E-02				1.10E-01		YES		4.50E-02			
Nickel	mg/kg	1.37E+01		YES		ND				4.60E+00	B			4.90E+00				1.15E+01			
Potassium	mg/kg	ND				ND				ND				ND				ND			
Selenium	mg/kg	ND				9.30E-01		YES		1.00E+00		YES		1.80E+00		YES		8.00E-01		YES	
Vanadium	mg/kg	ND				ND				1.24E+01				2.50E+01				1.09E+01			
Zinc	mg/kg	3.59E+01		YES		1.30E+01	B			1.92E+01	B			2.32E+01	B			2.92E+01	B		
<b>POLYCHLORINATED BIPHENYLS</b>																					
Aroclor 1254	mg/kg	ND				ND				ND				ND				ND			
Aroclor 1260	mg/kg	ND				ND				ND				ND				ND			
<b>SEMIVOLATILE ORGANIC COMPOUNDS</b>																					
Acenaphthylene	mg/kg	ND				ND				ND				ND				ND			
Benzo(a)anthracene	mg/kg	ND				ND				ND				ND				ND			
Benzo(a)pyrene	mg/kg	ND				ND				ND				ND				ND			
Benzo(b)fluoranthene	mg/kg	ND				ND				ND				ND				ND			
Benzo(ghi)perylene	mg/kg	ND				ND				3.70E-02	J			ND				ND			
Benzo(k)fluoranthene	mg/kg	ND				ND				ND				ND				ND			
Chrysene	mg/kg	ND				ND				ND				ND				ND			
Dibenz(a,h)anthracene	mg/kg	ND				ND				ND				ND				ND			
Fluoranthene	mg/kg	ND				ND				ND				ND				ND			
Indeno(1,2,3-cd)pyrene	mg/kg	ND				ND				ND				ND				ND			
Pyrene	mg/kg	ND				ND				ND				ND				ND			
bis(2-Ethylhexyl)phthalate	mg/kg	4.90E-02	J			9.10E-02	B			7.40E-02	B			8.10E-02	J			ND			

Table 2-2

**Subsurface Soil Analytical Results**  
**Remedial Investigation**  
**Former Chemical Laundry and Motor Pool Area 1500, Parcel 94(7)**  
**Fort McClellan, Calhoun County, Alabama**

(Page 4 of 7)

Parcel		FTA-94-GP05				FTA-94-GP06				FTA-94-GP07				FTA-94-GP08				FTA-94-GP09		
Sample Location		FTA-94				FTA-94				FTA-94				FTA-94				FTA-94		
Sample Number		EM0010				EM0011				EM0012				EM0014				EM0015		
Sample Date		27-Oct-98				21-Oct-98				21-Oct-98				27-Oct-98				21-Oct-98		
Sample Depth (Feet)		24 - 28				8-11				1-4				7-9				8-12		
Parameter	Units	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG
<b>VOLATILE ORGANIC COMPOUNDS</b>																				
1,1,2,2-Tetrachloroethane	mg/kg	ND				ND				4.40E-03	J			ND				ND		
1,2,4-Trimethylbenzene	mg/kg	ND				ND				4.30E-02				ND				ND		
1,2-Dimethylbenzene	mg/kg	ND				ND				2.30E-02				ND				ND		
1,3,5-Trimethylbenzene	mg/kg	ND				ND				1.10E-02				ND				ND		
2-Butanone	mg/kg	ND				ND				6.50E-03	J			ND				ND		
Acetone	mg/kg	1.80E-02	B			1.40E-02	B			1.60E-01	J			6.10E-02	J			3.80E-02	B	
Ethylbenzene	mg/kg	ND				ND				1.20E-02				ND				ND		
Methylene chloride	mg/kg	4.60E-03	B			8.50E-03	B			8.20E-03	B			4.80E-03	B			1.10E-02	B	
Toluene	mg/kg	ND				ND				2.10E-02				ND				ND		
Trichloroethene	mg/kg	1.80E-03	J			ND				1.90E-03	J			ND				ND		
m,p-Xylenes	mg/kg	ND				ND				6.30E-02				ND				ND		
n-Propylbenzene	mg/kg	ND				ND				4.40E-03	J			ND				ND		
p-Cymene	mg/kg	ND				ND				3.10E-02				ND				ND		

Table 2-2

**Subsurface Soil Analytical Results**  
**Remedial Investigation**  
**Former Chemical Laundry and Motor Pool Area 1500, Parcel 94(7)**  
**Fort McClellan, Calhoun County, Alabama**

(Page 5 of 7)

Parcel			FTA-94-GP10				FTA-94-GP11				FTA-94-GP12			
Sample Location			FTA-94				FTA-94				FTA-94			
Sample Number			EM0016				EM0018				EM0020			
Sample Date			21-Oct-98				21-Oct-98				21-Oct-98			
Sample Depth (Feet)			8-12				4-8				8-10			
Parameter	Units	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL
<b>METALS</b>														
Aluminum	mg/kg	YES	1.32E+04			YES	1.18E+04			YES	9.43E+03			YES
Arsenic	mg/kg	YES	6.50E+00			YES	9.30E+00			YES	6.70E+00			YES
Barium	mg/kg		6.92E+01				2.76E+01				ND			
Beryllium	mg/kg		ND				1.30E+00		YES		ND			
Calcium	mg/kg		ND				ND				ND			
Chromium	mg/kg	YES	1.49E+01				2.69E+01			YES	3.05E+01			YES
Cobalt	mg/kg		1.57E+01				6.80E+00				8.80E+00			
Copper	mg/kg		1.12E+01				5.48E+01		YES		3.02E+01		YES	
Iron	mg/kg	YES	2.37E+04			YES	4.63E+04		YES	YES	5.41E+04		YES	YES
Lead	mg/kg		2.51E+01	J			4.07E+01	J	YES		1.05E+01	J		
Magnesium	mg/kg		ND				ND				ND			
Manganese	mg/kg	YES	2.87E+03		YES	YES	6.90E+00				4.14E+01			
Mercury	mg/kg		6.50E-02				ND				4.00E-02			
Nickel	mg/kg		6.70E+00				ND				8.30E+00			
Potassium	mg/kg		ND				7.09E+02				ND			
Selenium	mg/kg		ND				2.20E+00		YES		1.50E+00		YES	
Vanadium	mg/kg		2.20E+01				ND				ND			
Zinc	mg/kg		2.03E+01	B			3.09E+01	B			4.97E+01		YES	
<b>POLYCHLORINATED BIPHENYLS</b>														
Aroclor 1254	mg/kg		ND				ND				ND			
Aroclor 1260	mg/kg		ND				ND				ND			
<b>SEMIVOLATILE ORGANIC COMPOUNDS</b>														
Acenaphthylene	mg/kg		ND				ND				ND			
Benzo(a)anthracene	mg/kg		ND				ND				ND			
Benzo(a)pyrene	mg/kg		ND				ND				ND			
Benzo(b)fluoranthene	mg/kg		ND				ND				ND			
Benzo(ghi)perylene	mg/kg		ND				ND				ND			
Benzo(k)fluoranthene	mg/kg		ND				ND				ND			
Chrysene	mg/kg		ND				ND				ND			
Dibenz(a,h)anthracene	mg/kg		ND				ND				ND			
Fluoranthene	mg/kg		ND				ND				ND			
Indeno(1,2,3-cd)pyrene	mg/kg		ND				ND				ND			
Pyrene	mg/kg		ND				ND				ND			
bis(2-Ethylhexyl)phthalate	mg/kg		7.60E-02	B			6.90E-02	B			8.50E-02	B		

Table 2-2

**Subsurface Soil Analytical Results**  
**Remedial Investigation**  
**Former Chemical Laundry and Motor Pool Area 1500, Parcel 94(7)**  
**Fort McClellan, Calhoun County, Alabama**

(Page 6 of 7)

Parcel			FTA-94-GP10				FTA-94-GP11				FTA-94-GP12			
Sample Location			FTA-94				FTA-94				FTA-94			
Sample Number			EM0016				EM0018				EM0020			
Sample Date			21-Oct-98				21-Oct-98				21-Oct-98			
Sample Depth (Feet)			8-12				4-8				8-10			
Parameter	Units	>SSL	Result	Qual	>BKG	>SSL	Result	Qual	>BKG	>SSL	Result	Qual	>BKG	>SSL
<b>VOLATILE ORGANIC COMPOUNDS</b>														
1,1,2,2-Tetrachloroethane	mg/kg		ND				ND				ND			
1,2,4-Trimethylbenzene	mg/kg		ND				ND				ND			
1,2-Dimethylbenzene	mg/kg		ND				ND				ND			
1,3,5-Trimethylbenzene	mg/kg		ND				ND				ND			
2-Butanone	mg/kg		ND				ND				ND			
Acetone	mg/kg		2.40E-02	B			1.20E-02	B			2.70E-02	B		
Ethylbenzene	mg/kg		ND				ND				ND			
Methylene chloride	mg/kg		7.80E-03	B			6.50E-03	B			7.30E-03	B		
Toluene	mg/kg		ND				ND				ND			
Trichloroethene	mg/kg		ND				ND				ND			
m,p-Xylenes	mg/kg		ND				ND				ND			
n-Propylbenzene	mg/kg		ND				ND				ND			
p-Cymene	mg/kg		ND				ND				ND			

**Table 2-2**  
**Subsurface Soil Analytical Results**  
**Former Chemical Laundry and Motor Pool Area 1500, Parcel**  
**94(7)**  
**Fort McClellan, Calhoun County, Alabama**

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Analyses performed by Quanterra Environmental Services using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods, including Update III methods where applicable.

<sup>a</sup> Background. Concentration listed is two times the arithmetic mean of background metals concentration given in

Science Applications International Corporation (1998), *Final Background Metals Survey Report*, Fort McClellan, Alabama, July.

<sup>b</sup> Residential human health site-specific screening level (SSSL) and ecological screening value (ESV) as given in IT Corporation (2000) *Final Human Health and Ecological Screening Values and PAH Background Summary Report*, Fort McClellan, Calhoun County, Alabama, March.

B - Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero).

J - Result is greater than stated method detection limit but less than or equal to specified reporting limit.

mg/kg - Milligrams per kilogram

ND - Not detected

Qual - Data validation qualifier

background concentrations. Samples with analytical results exceeding the SSSLs are presented on Figure 2-2.

**Metals.** The concentrations of manganese (FTA-94-GP01) and iron (FTA-94-GP05 and FTA-94-GP08) exceeded residential human health SSSLs and background concentrations.

**Semivolatile Organic Compounds.** Five SVOCs, including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene were detected at concentrations exceeding residential human health SSSLs and background concentrations. Sample locations FTA-94-GP02 and FTA-94-DEP01 contained all five of the detected SVOCs.

### **2.2.2 Subsurface Soil Sampling**

Twelve subsurface soil samples were collected from soil borings at the Former Chemical Laundry and Motor Pool Area 1500, Parcel 94(7), as shown on Figure 2-1. As shown on Table 2-2, three metals including iron, aluminum, and manganese exceeded the residential human health SSSLs and background concentrations. Samples with analytical results exceeding the SSSLs are presented on Figure 2-2.

**Metals.** The concentrations of iron (four locations); aluminum (two locations); and manganese (one location) exceeded residential human health SSSLs and background concentrations.

### **2.2.3 Groundwater Sampling**

Two temporary wells, FTA-94-GP02 and FTA-94-GP11, one direct-push temporary well, FTA-94-GP05, and one existing monitoring well, FTA-94-MW01, were sampled at the Former Chemical Laundry and Motor Pool Area 1500, Parcel 94(7). The well/groundwater sample locations are shown on Figure 2-1. Analytical results were compared to the human health SSSLs and metals background screening values. As shown on Table 2-3, six metals and two volatile organic compounds exceeded the human health SSSLs and background concentrations. Samples with analytical results exceeding the SSSLs are presented on Figure 2-3.

**Metals.** The concentrations of six metals, including aluminum, barium, iron, lead, thallium, and vanadium, exceeded residential human health SSSLs and background concentrations at temporary well FTA-94-GP11. The concentration of barium exceeded residential human health SSSLs and background concentrations at temporary well FTA-94-GP02.

Table 2-3

**Groundwater Analytical Results  
Remedial Investigation  
Former Chemical Laundry and Motor Pool Area 1500, Parce 94(7)  
Fort McClellan, Calhoun County, Alabama**

Parcel Sample Location Sample Number Sample Date				FTA-94-GP02 FTA-94 EM3001 28-Jan-99				FTA-94-GP05 FTA-94 EM3002 29-Oct-98				FTA-94-GP11 FTA-94 EM3006 01-Feb-99				FTA-94-MW01 FTA-94 EM3007 16-Nov-98			
Parameter	Units	BKG <sup>a</sup>	SSSL <sup>b</sup>	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL
<b>METALS</b>																			
Aluminum	mg/L	2.34E+00	1.56428	3.59E-01				6.75E-01				2.90E+01	J	YES	YES	9.72E-01			
Arsenic	mg/L	1.78E-02	4.00E-05	6.40E-03	J		YES	ND				9.90E-03	J		YES	ND			
Barium	mg/L	1.27E-01	1.10E-01	2.76E-01		YES	YES	ND				1.28E+00	J	YES	YES	ND			
Beryllium	mg/L	1.24E-03	3.12E-03	ND				ND				1.80E-03	B	YES		ND			
Calcium	mg/L	5.65E+01		8.24E+01		YES		1.12E+02		YES		5.44E+01				9.05E+01		YES	
Chromium	mg/L		4.69E-03	ND				ND				4.60E-02	J		YES	ND			
Cobalt	mg/L	2.34E-02	9.39E-02	7.60E-03	J			ND				1.74E-02	J			ND			
Copper	mg/L	2.55E-02	6.26E-02	ND				ND				4.58E-02	J	YES		ND			
Iron	mg/L	7.04E+00	4.69E-01	2.90E+00			YES	1.02E+00			YES	4.32E+01	J	YES	YES	1.19E+00			YES
Lead	mg/L	7.99E-03	1.50E-02	2.90E-03	J			ND				2.26E-02	J	YES	YES	ND			
Magnesium	mg/L	2.13E+01		2.88E+01		YES		5.07E+00				3.55E+01	J	YES		5.52E+00			
Manganese	mg/L	5.81E-01	7.35E-02	1.48E-01			YES	7.11E-02				5.08E-01	J		YES	4.60E-02			
Mercury	mg/L		4.60E-04	4.80E-05	J			ND				1.30E-04	J			ND			
Nickel	mg/L		3.13E-02	ND				ND				5.67E-02	J		YES	ND			
Potassium	mg/L	7.20E+00		9.48E+00		YES		ND				1.60E+01	J	YES		ND			
Sodium	mg/L	1.48E+01		9.30E+00				ND				1.17E+01	J			ND			
Thallium	mg/L	1.45E-03	1.00E-04	ND				ND				5.40E-03	B	YES	YES	ND			
Vanadium	mg/L	1.70E-02	1.10E-02	ND				ND				5.14E-02	J	YES	YES	ND			
Zinc	mg/L	2.20E-01	4.69E-01	ND				ND				9.24E-02	J			ND			
<b>SEMIVOLATILE ORGANIC COMPOUNDS</b>																			
Phenol	mg/L		9.31E-01	ND				3.80E-03	B			ND				1.60E-03	B		
bis(2-Ethylhexyl)phthalate	mg/L		4.30E-03	ND				1.30E-03	J			ND				ND			
<b>VOLATILE ORGANIC COMPOUNDS</b>																			
Chlorobenzene	mg/L		1.62E-02	ND				ND				ND				3.40E-03			
Methylene chloride	mg/L		7.85E-03	ND				ND				1.60E-03	B			ND			
Tetrachloroethene	mg/L		1.25E-03	ND				1.90E-04	J			ND				ND			
Trichloroethene	mg/L		4.50E-03	ND				7.60E-03			YES	ND				2.50E-02			YES
Vinyl chloride	mg/L		3.00E-05	ND				ND				ND				9.20E-04	J		YES
cis-1,2-Dichloroethene	mg/L		1.55E-02	ND				ND				ND				6.90E-03			
trans-1,2-Dichloroethene	mg/L		3.07E-02	ND				ND				ND				9.70E-04	J		

Analyses performed by Quanterra Environmental Services using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods, including Update III methods where applicable.

<sup>a</sup> Background. Concentration listed is two times the arithmetic mean of background metals concentration given in

Science Applications International Corporation (1998), *Final Background Metals Survey Report*, Fort McClellan, Alabama, July.

<sup>b</sup> Residential human health site-specific screening level (SSSL) and ecological screening value (ESV) as given in IT Corporation (2000) *Final Human Health and Ecological Screening Values and PAH Background Summary Report*, Fort McClellan, Calhoun County, Alabama, March.

B - Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero).

J - Result is greater than stated method detection limit but less than or equal to specified reporting limit.

mg/L - Milligrams per liter

ND - Not detected

Qual - Data validation qualifier

**Volatile Organic Compounds.** Two volatile organic compounds, TCE and vinyl chloride, were detected at concentrations exceeding residential human health SSSLs. TCE was detected at concentrations of 0.025 milligrams per liter (mg/L) and 0.0076 mg/L at sample locations FTA-94-MW01 and FTA-94-GP05, respectively. The residential human health SSSL for TCE is 0.0045 mg/L. Vinyl chloride was detected at 0.00092 mg/L at sample location FTA-94-MW01. The residential human health SSSL for vinyl chloride is 0.00003 mg/L.

#### **2.2.4 Water Level Measurements and Groundwater Flow**

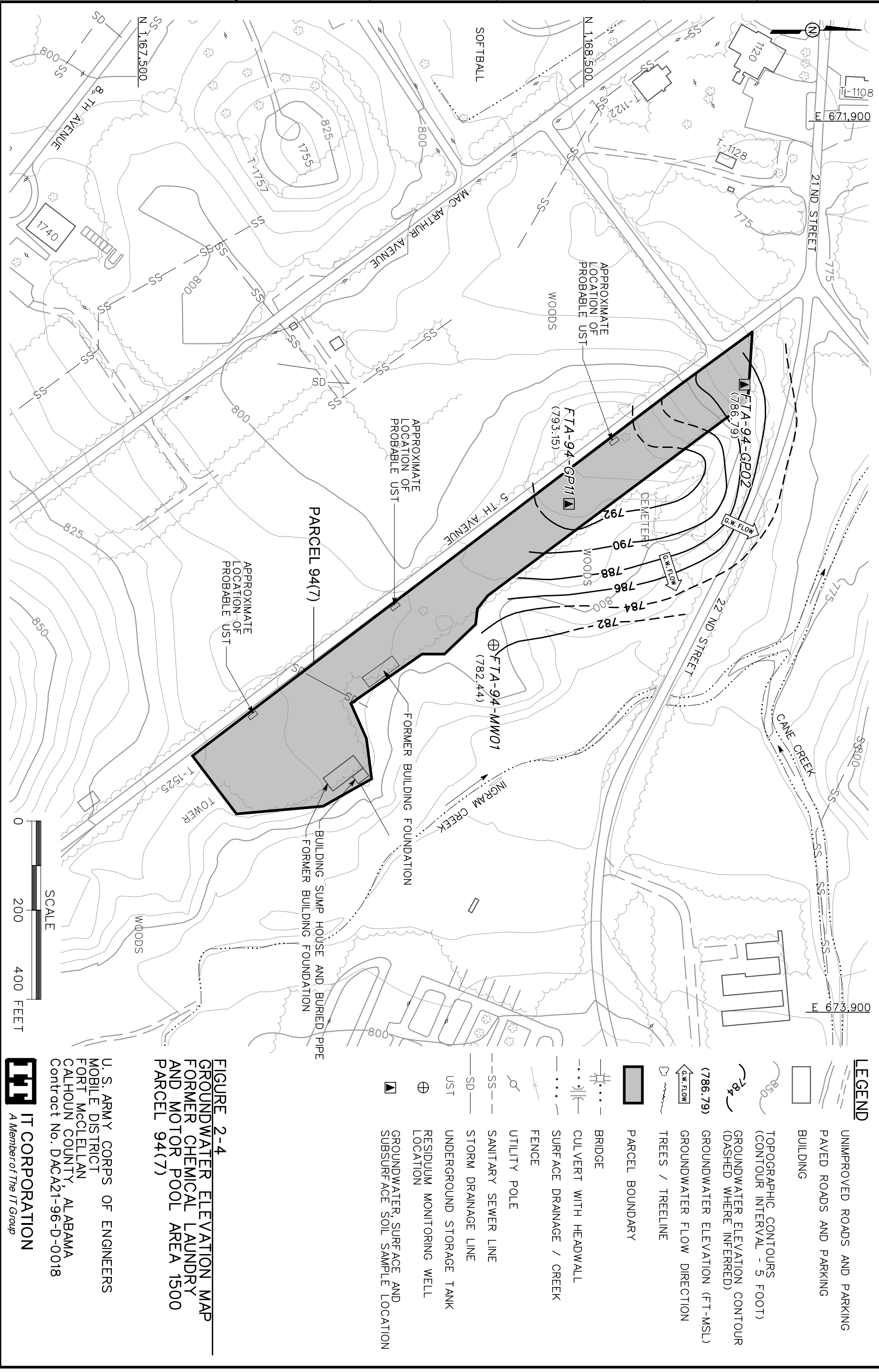
The depth to groundwater was measured in two temporary wells and one existing monitoring well at the Former Chemical Laundry and Motor Pool Area 1500, Parcel 94(7) following procedures outlined in Section 4.18 of the SAP (IT, 2000). Measurements were referenced to the top of the PVC stickup. A groundwater elevation map, constructed from March 13, 2000 data, is presented as Figure 2-4. Based on the March groundwater levels, horizontal groundwater flow is to the northeast, towards Ingram Creek.

### **2.3 Subsurface Soil Sampling**

Thirteen subsurface soil samples were collected from soil borings at the Former Washrack, Building 1740, Soldier's Chapel, Parcel 127(7), as shown on Figure 2-1. As shown on Table 2-2, two metals, including aluminum and chromium, exceeded the residential human health SSSLs and background concentrations. Samples with analytical results exceeding the SSSLs are presented on Figure 2-2.

**Metals.** The concentrations of aluminum (one location) and chromium (one location) exceeded residential human health SSSLs and background concentrations.





## **3.0 Proposed Field Activities**

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### **3.1 Environmental Sampling**

The proposed environmental sampling program during the RI at the Former Chemical Laundry and Motor Pool Area 1500, Parcel 94(7) includes the collection of seven surface soil samples, twelve groundwater samples, three surface water samples, and three sediment samples for chemical analysis. These samples will be collected and analyzed to provide data in order to determine the horizontal and vertical extent of contamination.

### **3.2 Surface Soil Sampling Locations and Rationale**

Seven surface soil samples will be collected using a hand auger or stainless steel spoon at the Former Chemical Laundry and Motor Pool Area 1500, Parcel 94(7). One surface soil sample will be collected underneath the concrete floor of the former sump house and six surface soil samples will be collected adjacent to an underground pipeline located adjacent to the former sump house. The surface soil sampling rationale is provided in Table 3-1. Proposed sampling locations are shown on Figure 3-1. Surface soil sample designations, depths, and required quality assurance/quality control (QA/QC) sample quantities are listed in Table 3-2. The exact surface soil sampling locations will be determined in the field by the on-site geologist based on actual field conditions. Surface soil samples will be collected from the upper 1 foot of soil and in accordance with the procedures specified in Section 4.7.1.1 of the SAP (IT, 2000).

### **3.3 Residuum Monitoring Wells**

Ten permanent residuum-monitoring wells will be installed at the Former Chemical Laundry and Motor Pool Area 1500, Parcel 94(7). Eight permanent wells will be installed as perimeter monitoring wells to delineate the horizontal extent of groundwater contamination. One permanent residuum monitoring well will be installed adjacent to existing temporary well FTA-94-GP05 and one permanent residuum monitoring well will be installed adjacent to existing sample location FTA-94-GP08. The temporary well will be abandoned in accordance with Alabama Department of Environmental Management guidelines. The proposed permanent residuum monitoring well locations are shown on Figure 3-1. The exact monitoring well locations will be determined in the field by the on-site geologist based on actual field conditions.

Soil samples will be collected at 5-foot intervals to the total depth of the hole during hollow-stem auger drilling. Samples will be collected using a 2-inch diameter or larger split-spoon sampler. Lithologic samples will be collected for all monitoring wells during drilling to provide a detailed

Table 3-1

**Site Sampling Rationale**  
**Remedial Investigation**  
**Former Chemical Laundry and Motor Pool Area 1500, Parcel 94(7)**  
**Fort McClellan, Calhoun County, Alabama**

(Page 1 of 3)

Sample Location	Sample Media	Site Sampling Rationale
FTA-94-MW01	Groundwater	Groundwater from existing monitoring well FTA-94-MW01 will be resampled as part of the RI activities to verify the presence of trichloroethene in groundwater and determine if any change in concentration has occurred.
FTA-94-MW02	Groundwater	Permanent residuum groundwater monitoring well FTA-94-MW02 will be installed approximately 200 feet northwest of existing well FTA-94-MW01. The monitoring well will be constructed to an estimated depth of approximately 40 feet below ground surface. Groundwater samples will be collected and analyzed to determine the horizontal extent of
FTA-94-MW03	Groundwater	Permanent residuum groundwater monitoring well FTA-94-MW03 will be installed approximately 300 feet north-northeast of existing well FTA-94-MW01, on the south side of Ingram Creek. The monitoring well will be constructed to an estimated depth of approximately 25 feet below ground surface. Groundwater samples will be collected and analyzed to determine the horizontal extent of trichloroethene in groundwater hydraulically downgradient of FTA-94-MW01
FTA-94-MW04	Groundwater	Permanent residuum groundwater monitoring well FTA-94-MW04 will be installed approximately 300 feet northeast of existing well FTA-94-MW01 on the south side of Ingram Creek. The monitoring well will be constructed to an estimated depth of approximately 40 feet below ground surface. Groundwater samples will be collected and analyzed to determine the horizontal extent of trichloroethene in groundwater hydraulically downgradient of FTA-94-MW01
FTA-94-MW05	Groundwater	Permanent residuum groundwater monitoring well FTA-94-MW05 will be installed approximately 250 feet southeast of existing well FTA-94-MW01 to replace temporary well FTA-94-GP05. The monitoring well will be constructed to an estimated depth of approximately 30 feet below ground surface. Groundwater samples will be collected and analyzed to determine the horizontal extent of trichloroethene in groundwater hydraulically downgradient of FTA-94-MW01
FTA-94-MW06	Groundwater	Permanent residuum groundwater monitoring well FTA-94-MW06 will be installed approximately 275 feet east of existing well FTA-94-MW01, on the south side of Ingram Creek. The monitoring well will be constructed to an estimated depth of approximately 25 feet below ground surface. Groundwater samples will be collected and analyzed to determine the horizontal extent of trichloroethene in groundwater hydraulically downgradient of FTA-94-MW01 and
FTA-94-MW07	Groundwater	Permanent residuum groundwater monitoring well FTA-94-MW07 will be installed approximately 600 feet southeast of existing well FTA-94-MW01, on the south side of Ingram Creek. The monitoring well will be constructed to an estimated depth of approximately 25 feet below ground surface. Groundwater samples will be collected and analyzed to determine the horizontal extent of trichloroethene in groundwater southeast of the parcel
FTA-94-MW08	Groundwater	Permanent residuum groundwater monitoring well FTA-94-MW08 will be installed approximately 400 feet southeast of existing well FTA-94-MW01 adjacent to sample location FTA-94-GP08. The monitoring well will be constructed to an estimated depth of approximately 40 feet below ground surface. Groundwater samples will be collected and analyzed to verify the presence of trichloroethene in groundwater from a former direct push groundwater sample

Table 3-1

**Site Sampling Rationale  
Remedial Investigation  
Former Chemical Laundry and Motor Pool Area 1500, Parcel 94(7)  
Fort McClellan, Calhoun County, Alabama**

(Page 2 of 3)

Sample Location	Sample Media	Site Sampling Rationale
FTA-94-MW09	Groundwater	Permanent residuum groundwater monitoring well FTA-94-MW09 will be installed approximately 380 feet south of existing well FTA-94-MW01 southwest of the parcel boundary. The monitoring well will be constructed to an estimated depth of approximately 50 feet below ground surface. Groundwater samples will be collected and analyzed to verify
FTA-94-MW10	Groundwater	Permanent residuum groundwater monitoring well FTA-94-MW10 will be installed approximately 200 feet southwest and hydraulically upgradient of existing well FTA-94-MW01. The monitoring well will be constructed to an estimated depth of approximately 50 feet below ground surface. Groundwater samples will be collected and analyzed to verify
FTA-94-MW11	Groundwater	A permanent bedrock groundwater monitoring well FTA-94-MW11 will be installed adjacent to existing well location FTA-94-MW01. The monitoring well will be installed as a double cased well, with the outer casing installed to approximately 45 feet below ground surface, and the inner casing installed to an estimated total depth of approximately 75 feet below ground surface. Groundwater samples will be collected and analyzed to determine the
FTA-94-MW12	Groundwater	Contingency. A permanent bedrock groundwater monitoring well FTA-94-MW12 may be installed adjacent to proposed well location FTA-94-MW03 if groundwater contamination is present in the residuum. The monitoring well will be installed with as a double cased well, with the outer casing installed to approximately 45 feet below ground surface, and the inner casing installed to an estimated total depth of approximately 75 feet below ground surface.
FTA-94-GP13	Surface Soil	A surface soil sample will be collected along a northeast-southwest trending buried pipeline located northeast of existing sample location FTA-94-GP08 to determine if the pipeline is a source of contaminants in surface soil and groundwater.
FTA-94-GP14	Surface Soil	A surface soil sample will be collected along a northeast-southwest trending buried pipeline located northeast of existing sample location FTA-94-GP08 to determine if the pipeline is a source of contaminants in surface soil and groundwater.
FTA-94-GP15	Surface Soil	A surface soil sample will be collected along a northeast-southwest trending buried pipeline located northeast of existing sample location FTA-94-GP08 to determine if the pipeline is a source of contaminants in surface soil and groundwater.
FTA-94-GP16	Surface Soil	A surface soil sample will be collected along a northeast-southwest trending buried pipeline located northeast of existing sample location FTA-94-GP08 to determine if the pipeline is a source of contaminants in surface soil and groundwater.
FTA-94-GP17	Surface Soil	A surface soil sample will be collected along a northeast-southwest trending buried pipeline located northeast of existing sample location FTA-94-GP08 to determine if the pipeline is a source of contaminants in surface soil and groundwater.

**Table 3-1**

**Site Sampling Rationale  
Remedial Investigation  
Former Chemical Laundry and Motor Pool Area 1500, Parcel 94(7)  
Fort McClellan, Calhoun County, Alabama**

(Page 3 of 3)

Sample Location	Sample Media	Site Sampling Rationale
FTA-94-GP18	Surface Soil	A surface soil sample will be collected along a northeast-southwest trending buried pipeline located northeast of existing sample location FTA-94-GP08 to determine if the pipeline is a source of contaminants in surface soil and
FTA-94-GP19	Surface Soil	A surface soil sample will be collected underneath the concrete building sump house located next to the former building foundation. Sample data will determine if the sump house is a source of contaminants in surface soil and
WS-94-SW/SD03	Surface Water	A surface water/sediment sample will be collected at the confluence of Ingram Creek and Cane Creek. Samples will be analyzed to determine if trichlorethene is present.
WS-94-SW/SD04	Surface Water	A surface water/sediment sample will be collected approximately 380 feet east-southeast of FTA-94-MW01, and approximately midway between existing sample points WS-94-SW/SD01 and WS-94-SW/SD02 in Ingram Creek. Samples will be analyzed to determine if trichlorethene is present.
WS-94-SW/SD05	Surface Water	A surface water/sediment sample will be collected approximately 500 feet east of FTA-94-12, and south of sample point WS-94-SW/SD02 in Ingram Creek. Samples will be analyzed to determine if trichlorethene is present.

Table 3-2

**Sample Designations and QA/QC Sample Quantities**  
**Remedial Investigation**  
**Former Chemical Laundry and Motor Pool Area 1500, Parcel 94(7)**  
**Fort McClellan, Calhoun County, Alabama**

(Page 1 of 2)

Sample Location	Sample Designation	Sample Matrix	Sample Depth (ft)	QA/QC Samples			Analytical Suite
				Field Duplicates	Field Splits	MS/MSD	
FTA-94-MW01	FTA-94-MW01-GW-EMM3001-REG	Groundwater	a				TCL VOCs
FTA-94-MW02	FTA-94-MW02-GW-EMM3002-REG	Groundwater	a				TCL VOCs
FTA-94-MW03	FTA-94-MW03-GW-EMM3003-REG	Groundwater	a	FTA-94-MW03-GW-EMM3004-FD	FTA-94-MW03-GW-EMM3005-FS		TCL VOCs
FTA-94-MW04	FTA-94-MW04-GW-EMM3006-REG	Groundwater	a				TCL VOCs
FTA-94-MW05	FTA-94-MW05-GW-EMM3007-REG	Groundwater	a				TCL VOCs
FTA-94-MW06	FTA-94-MW06-GW-EMM3008-REG	Groundwater	a				TCL VOCs
FTA-94-MW07	FTA-94-MW07-GW-EMM3009-REG	Groundwater	a				TCL VOCs
FTA-94-MW08	FTA-94-MW08-GW-EMM3010-REG	Groundwater	a				TCL VOCs
FTA-94-MW09	FTA-94-MW09-GW-EMM3011-REG	Groundwater	a				TCL VOCs
FTA-94-MW10	FTA-94-MW10-GW-EMM3012-REG	Groundwater	a				TCL VOCs
FTA-94-MW11	FTA-94-MW11-GW-EMM3013-REG	Groundwater	a				TCL VOCs
FTA-94-MW12	FTA-94-MW12-GW-EMM3014-REG	Groundwater	a			FTA-94-MW12-GW-EMM3014-MS/MSD	TCL VOCs
FTA-94-GP13	FTA-94-GP13-GP-EMM0001-REG	Surface Soil	b				TCL VOCs
FTA-94-GP14	FTA-94-GP14-GP-EMM0002-REG	Surface Soil	b				TCL VOCs
FTA-94-GP15	FTA-94-GP15-GP-EMM0003-REG	Surface Soil	b				TCL VOCs

Table 3-2

**Sample Designations and QA/QC Sample Quantities**  
**Remedial Investigation**  
**Former Chemical Laundry and Motor Pool Area 1500, Parcel 94(7)**  
**Fort McClellan, Calhoun County, Alabama**

(Page 2 of 2)

Sample Location	Sample Designation	Sample Matrix	Sample Depth (ft)	QA/QC Samples			Analytical Suite
				Field Duplicates	Field Splits	MS/MSD	
FTA-94-GP16	FTA-94-GP16-GP-EMM0004-REG	Surface Soil	b				TCL VOCs
FTA-94-GP17	FTA-94-GP17-GP-EMM0005-REG	Surface Soil	b	FTA-94-GP17-GP-EMM0006-FD	FTA-94-GP17-GP-EMM0007-FS		TCL VOCs
FTA-94-GP18	FTA-94-GP18-GP-EMM0008-REG	Surface Soil	b			FTA-94-GP18-GP-EMM0008-MS/MSD	TCL VOCs
FTA-94-GP19	FTA-94-GP19-GP-EMM0009-REG	Surface Soil	b				TCL VOCs
WS-94-SW/SD03	WS-94-SW/SD01-WS-EMM2001-REG	Surface Water	N/A				TCL VOCs
WS-94-SW/SD03	WS-94-SW/SD01-WS-EMM1001-REG	Sediment	0-0.5 foot				TCL VOCs
WS-94-SW/SD04	WS-94-SW/SD01-WS-EMM2002-REG	Surface Water	N/A			WS-94-SW/SD01-WS-EMM2002-MS/MSD	TCL VOCs
WS-94-SW/SD04	WS-94-SW/SD01-WS-EMM1002-REG	Sediment	0-0.5 foot			WS-94-SW/SD01-WS-EMM1002-MS/MSD	TCL VOCs
WS-94-SW/SD05	WS-94-SW/SD01-WS-EMM2003-REG	Surface Water	N/A	WS-94-SW/SD01-WS-EMM2004-FD	WS-94-SW/SD01-WS-EMM2005-FS		TCL VOCs
WS-94-SW/SD05	WS-94-SW/SD01-WS-EMM1003-REG	Sediment	0-0.5 foot	WS-94-SW/SD01-WS-EMM1004-FD	WS-94-SW/SD01-WS-EMM1005-FS		TCL VOCs

<sup>a</sup>Sample depth will depend on where sufficient first water is encountered to collect a water sample.

<sup>b</sup> Actual sample depth selected for analysis will be at the discretion of the site geologist and will be based on field observation.

FD - Field duplicate.

FS - Field split.

GP - Geoprobe/direct push.

MS/MSD - Matrix spike/matrix spike duplicate.

MW - Monitoring well.

N/A - not applicable.

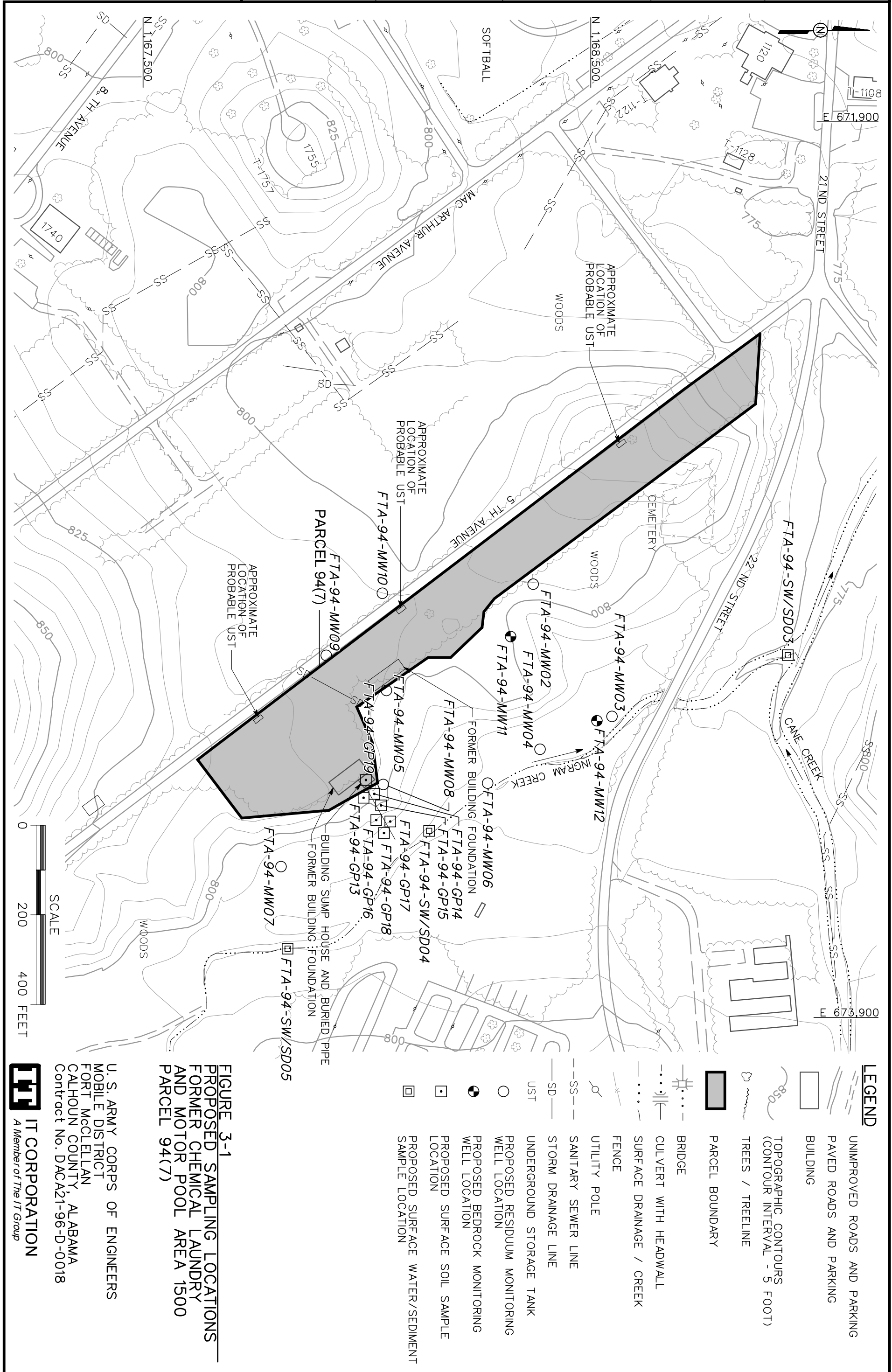
QA/QC - Quality assurance/quality control.

REG - Field sample.

SW/SD - Surface water/sediment.

TCL - Target compound list.

VOC - Volatile organic compound.





lithologic log. All soil borings will be logged in accordance with American Society for Testing and Materials Method D 2488 using the Unified Soil Classification System. All soil samples will be screened in the field using a photoionization detector to verify the potential presence of contamination. None of the subsurface soil samples will be sent to the laboratory. The permanent residuum monitoring wells will be drilled, installed, and developed as specified in Section 4.8 and Appendix C of the SAP (IT, 2000998c). Groundwater samples will not be collected from residuum wells for a period of at least 14 days after well development.

### **3.4 Bedrock Monitoring Wells**

One permanent bedrock-monitoring well (FTA-94-MW11) will be installed at the Former Chemical Laundry and Motor Pool Area 1500, Parcel 94(7). In addition, a permanent bedrock monitoring well (FTA-94-MW12) may be installed near Ingram Creek, adjacent to proposed residuum monitoring well, FTA-94-MW03, if groundwater contamination is present in the residuum groundwater zone. If groundwater contamination is not present in the residuum groundwater zone, then proposed bedrock monitoring well FTA-94-MW12 will not be installed. The proposed bedrock monitoring well locations are shown on Figure 3-1. The permanent bedrock monitoring wells will be drilled, installed, and developed as specified in Section 4.8 and Appendix C of the SAP (IT, 2000).

The bedrock monitoring well boreholes will be drilled using a combination of air rotary drilling and bedrock coring techniques. A drill rig able to employ both methods will be used, if possible, to minimize mobilization costs. The bedrock monitoring wells will be drilled a minimum of 20 feet into competent bedrock.

Bedrock monitoring well FTA-94-MW11 will be installed prior to installation of the residuum wells. Bedrock monitoring well FTA-94-MW12 will be installed as a contingency well if groundwater contamination is found to be present in residuum monitoring well FTA-94-MW03. Split-spoon samples will not be collected from the bedrock borings. An air rotary rig with a 12-inch percussion bit or rotary bit will be used to drill the boreholes from land surface to 5 feet into competent bedrock. An 8-inch ID carbon steel International Pipe Standard (IPS) outer casing will then be installed into the boreholes from land surface to 5 feet into bedrock. The depth of the 8-inch carbon steel casing is anticipated to be approximately 45 feet below ground surface, based on the refusal depth of nearby existing monitoring wells. A minimum of 2-inch annular

space between the outer casing and borehole wall will be required. The 8-inch carbon steel outer casing will be grouted in-place using a tremie pipe suspended in the annulus outside of the casing. Bentonite-cement grout will be mixed using approximately 6.5 to 7 gallons of water, and 5 pounds of bentonite per 94 pound bag of Type I Portland cement. After the grout has cured a minimum of 48 hours, the borehole will be advanced an additional 15 feet utilizing a PQ wireline core barrel, which will be used to collect core samples continuously. The hole depth into competent bedrock will be increased if groundwater is not encountered. After completion of core sample collection, a 7 7/8-inch air percussion bit will be used to ream the hole a minimum of 15 feet below the bottom of the surface casing and into competent bedrock. The compressor on the drill rig will be equipped with an air filter between the compressor and the drill bit. Water will be the only lubricant allowed during drilling operations.

Four-inch monitoring wells will be installed inside the outer casing at both proposed well locations. The well casing diameter will consist of new, 4-inch ID, Schedule 80, threaded, flush-joint, polyvinyl chloride (PVC) pipe. Attached to the bottom of the well casing will be a section of new threaded, flush joint 0.010-inch continuous wrap PVC well screen, approximately 10 to 15 feet long. Attached to the bottom of the well will be a sump, approximately 3 to 5 feet long, composed of new, 4-inch ID, Schedule 80, threaded, flush joint PVC pipe. After the casing and screen material are lowered into the boring, a gravel pack will be installed around the well screen and the inside casing will be grouted from the top of the gravel pack to land surface. The gravel pack will be tremied into place from the bottom of the sump to approximately 5 feet above the top of the screen. The gravel pack will consist of 20/40 silica sand. A bentonite seal, approximately 5 feet thick, will be placed above the gravel pack. The remaining annular space will be grouted with a bentonite-cement mixture seal to ground surface. The bedrock monitoring wells will be developed as specified in Section 4.8 and Appendix C of the SAP (IT, 2000). Groundwater samples will not be collected from bedrock wells for a period of 14 days after well development.

### ***3.5 Groundwater Sampling Locations and Rationale***

Groundwater samples will be collected from the residuum and bedrock wells installed at the site. Groundwater sampling rationale is presented in Table 3-1. The groundwater sample designations and required QA/QC sample quantities are listed in Table 3-2. The groundwater samples will be collected in accordance with the procedures specified in the SAP (IT, 2000).

### ***3.6 Surface Water Sampling Locations and Rationale***

Three surface water samples will be collected from Ingram Creek, as shown on Figure 3-1. The surface water sampling rationale are listed in Table 3-1. The surface water sample designation and required QA/QC sample quantities are listed in Table 3-2. The exact sampling location will be determined in the field based on actual field observations.

### ***3.7 Sediment Sampling Locations and Rationale***

Three sediment samples will be collected from Ingram Creek as shown on Figure 3-1. The sediment samples will be collected at the same locations as the surface water samples described in Section 3.1.5. Sediment sampling rationale is presented in Table 3-1. The sediment sample designation and required QA/QC sample requirements are listed in Table 3-2. The actual sediment sample point will be at the discretion of the ecological sampler, based on actual field observations.

### ***3.8 Seep Survey***

A site walk will be conducted to determine if any seeps are present at the Former Chemical Laundry and Motor Pool Area 1500, Parcel 94(7). Seep locations will be located and marked in the field using wooden survey stakes or pin flags. Surface water samples may be collected from the seep(s) if present to help determine the presence or absence of potential contaminants, namely TCE and vinyl chloride.

### ***3.9 Investigative-Derived Waste Management and Disposal***

Investigative-derived waste (IDW) will be managed and disposed of as outlined in Appendix D of the SAP (IT, 2000). The IDW expected to be generated from the field sampling at FTMC will consist of soils from the hollow-stem auger sampling, purge water from monitoring well development and sampling activities, decontamination fluids, spent well materials, and personal protective equipment. The IDW will be staged inside the fenced area near Buildings 335 and 336 while awaiting final disposal.

### ***3.10 Site-Specific Safety and Health***

Health and safety requirements for the field activities are provided in the SSHP attachment for the Former Chemical Laundry and Motor Pool Area 1500, Parcel 94(7) (IT, 2000). The SSHP attachment will be used in conjunction with the installation-wide safety and health plan.

## ***4.0 Project Schedule***

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The project schedule for the RI activities will be provided by the IT Project Manager to the BRAC Cleanup Team on a monthly basis.

## 5.0 References

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Environmental Science and Engineering, Inc., 1998, *Final Environmental Baseline Survey, Fort McClellan, Alabama*, prepared for U.S. Army Environmental Center, Aberdeen Proving Ground, Maryland, January.

IT Corporation (IT), 2000, *Final Installation-Wide Sampling and Analysis Plan, Fort McClellan, Calhoun County, Alabama*, March.

IT Corporation (IT), 1998a, *Final Site-Specific Field Sampling Plan for the Former Chemical Laundry and Motor Pool Area 1500, Parcel 94(7)*, October.

IT Corporation (IT), 1998b, *Final Installation-Wide Work Plan, Fort McClellan, Calhoun County, Alabama*, October.

**ATTACHMENT 1**

**LIST OF ABBREVIATIONS AND ACRONYMS**

# List of Abbreviations and Acronyms

Abs	skin absorption
AC	hydrogen cyanide
AcB2	Anniston and Allen gravelly loams, 2 to 6 percent slopes, eroded
AcC2	Anniston and Allen gravelly loams, 6 to 10 percent slopes, eroded
AcD2	Anniston and Allen gravelly loams, 10 to 15 percent slopes, eroded
AcE2	Anniston and Allen gravelly loams, 15 to 25 percent slopes, eroded
ACGIH	American Conference of Governmental Industrial Hygienists
ADEM	Alabama Department of Environmental Management
AEL	airborne exposure limit
AL	Alabama
amb.	Amber
ANAD	Anniston Army Depot
APT	armor piercing tracer
ASP	Ammunition Supply Point
ASR	Archives Search Report, July 1999
AST	aboveground storage tank
ASTM	American Society for Testing and Materials
B	analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero)
BCT	BRAC Cleanup Team
BFB	bromofluorobenzene
bgs	below ground surface
bkg	background
bls	below land surface
BOD	biological oxygen demand
BRAC	Base Realignment and Closure
Braun	Braun Intertec Corporation
BTEX	benzene, toluene, ethylbenzene, and xylenes
BTOC	below top of casing
BZ	breathing zone
C	ceiling limit value
Ca	carcinogen
CCAL	continuing calibration
CCB	continuing calibration blank
CD	compact disc
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERFA	Community Environmental Response Facilitation Act
CESAS	Corps of Engineers South Atlantic Savannah
CFC	chlorofluorocarbon
CG	cyanogen chloride
ch	inorganic clays of high plasticity
CK	carbonyl chloride
cl	inorganic clays of low to medium plasticity
Cl.	chlorinated
CLP	Contract Laboratory Program
CN	chloroacetophenone
CNB	chloroacetophenone, benzene, and carbon tetrachloride
CNS	chloroacetophenone, chloropicrin, and chloroform
COC	chain of custody

COE	Corps of Engineers
Con	skin or eye contact
CRL	certified reporting limit
CRZ	contamination reduction zone
CS	ortho-chlorobenzylidene-malononitrile
CSEM	conceptual site exposure model
ctr.	container
CWA	chemical warfare agent
CWM	chemical warfare materials, clear wide mouth
CX	dichloroformoxime
D	duplicate
DANC	decontamination agent, non-corrosive
°C	degrees Celsius
°F	degrees Fahrenheit
DDT	dichlorodiphenyltrichloroethane
DEP	depositional soil
DI	deionized
DIMP	di-isopropylmethylphosphonate
DMMP	dimethylmethylphosphonate
DOD	U.S. Department of Defense
DP	direct-push
DPDO	Defense Property Disposal Office
DQO	data quality objective
DRMO	Defense Reutilization and Marketing Office
DS	deep (subsurface) soil
DS2	Decontamination Solution Number 2
E&E	Ecology and Environment, Inc.
EBS	environmental baseline survey
Elev.	elevation
EM	electromagnetic
EM31	Geonics Limited EM31 Terrain Conductivity Meter
EM61	Geonics Limited EM61 High-Resolution Metal Detector
EOD	explosive and ordnance disposal
EODT	explosive and ordnance disposal team
EPA	U.S. Environmental Protection Agency
EPC	exposure point concentration
EPIC	Environmental Photographic Interpretation Center
ER	equipment rinsate
ESE	Environmental Science and Engineering, Inc.
ESV	ecological screening value
E-W	east to west
EZ	exclusion zone
FB	field blank
FD	field duplicate
FedEx	Federal Express, Inc.
FFE	field flame expedient
Fil	filtered
Flt	filtered

FMP 1300	Former Motor Pool 1300 Site
Frtn	fraction
FS	field split
ft	feet
ft/ft	feet per foot
FTA	fire training area
FTMC	Fort McClellan
g	gram
G-856	Geometrics, Inc. G-856 magnetometer
G-858G	Geometrics, Inc. G-858G magnetic gradiometer
gal	gallon
gal/min	gallons per minute
GB	sarin
gc	clay gravels; gravel-sand-clay mixtures
GC	gas chromatograph
GC/MS	gas chromatograph/mass spectrometer
GFAA	graphite furnace atomic absorption
gm	silty gravels; gravel-sand-silt mixtures
gp	poorly graded gravels; gravel-sand mixtures
gpm	gallons per minute
GPR	ground-penetrating radar
GPS	global positioning system
GSBP	Ground Scar Boiler Plant
GSSI	Geophysical Survey Systems, Inc.
GW	groundwater
gw	well-graded gravels; gravel-sand mixtures
HA	hand auger
HCl	hydrochloric acid
HD	distilled mustard
HDPE	high-density polyethylene
Herb.	herbicides
HNO <sub>3</sub>	nitric acid
hr	hour
H&S	health and safety
HSA	hollow stem auger
HTRW	hazardous, toxic, and radioactive waste
I	out of control, data rejected due to low recovery
ICAL	initial calibration
ICB	initial calibration blank
ICP	inductively-coupled plasma
ICS	interference check sample
ID	inside diameter
IDL	instrument detection limit
IDLH	immediately dangerous to life or health
IDW	investigation-derived waste
IMPA	isopropylmethyl phosphonic acid
in.	inch
Ing	ingestion

**List of Abbreviations and Acronyms (Continued)**

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Inh	inhalation	ND	not detected	qty	quantity
IP	ionization potential	NE	no evidence	Qual	qualifier
IPS	International Pipe Standard	NFA	No Further Action	R	rejected
IRDMIS	Installation Restoration Data Management Information System	ng/L	nanograms per liter	RCRA	Resource Conservation and Recovery Act
IT	IT Corporation	NGVD	National Geodetic Vertical Datum	ReB3	Rarden silty clay loams
ITEMS	IT Environmental Management System <sup>TM</sup>	NIC	notice of intended change	REG	field sample
J	estimated concentration	NIOSH	National Institute for Occupational Safety and Health	REL	recommended exposure limit
JeB2	Jefferson gravelly fine sandy loam, 2 to 6 percent slopes, eroded	No.	number	RFA	request for analysis
JeC2	Jefferson gravelly fine sandy loam, 6 to 10 percent slopes, eroded	NOAA	National Oceanic and Atmospheric Administration	RI	remedial investigation
JfB	Jefferson stony fine sandy loam, 0 to 10 percent slopes have strong slopes	NR	not requested	RL	reporting limit
K	conductivity	ns	nanosecond	RPD	relative percent difference
L	lewisite; liter	N-S	north to south	RRF	relative response factor
LC <sub>50</sub>	lethal concentration for 50 percent of population tested	nT	nanotesla	RSD	relative standard deviation
LD <sub>50</sub>	lethal dose for 50 percent of population tested	NTU	nephelometric turbidity unit	RTK	real-time kinematic
l	liter	O&G	oil and grease	SAD	South Atlantic Division
LCS	laboratory control sample	OD	outside diameter	SAE	Society of Automotive Engineers
LEL	lower explosive limit	OE	ordnance and explosives	SAIC	Science Applications International Corporation
LT	less than the certified reporting limit	oh	organic clays of medium to high plasticity	SAP	installation-wide sampling and analysis plan
max	maximum	ol	organic silts and organic silty clays of low plasticity	sc	clayey sands; sand-clay mixtures
MDL	method detection limit	OP	organophosphorus	Sch.	schedule
mg/kg	milligrams per kilogram	OSHA	Occupational Safety and Health Administration	SD	sediment
mg/L	milligrams per liter	OWS	oil/water separator	SDG	sample delivery group
mg/m <sup>3</sup>	milligrams per cubic meter	oz	ounce	SDZ	safe distance zone
mh	inorganic silts, micaceous or diatomaceous fine, sandy or silt soils	PAH	polynuclear aromatic hydrocarbon	SEMS	Southern Environmental Management & Specialties
MHz	megahertz	Pb	lead	SFSP	site-specific field sampling plan
µg/g	micrograms per gram	PCB	polychlorinated biphenyl	SGF	standard grade fuels
µg/kg	micrograms per kilogram	PCE	perchlorethene	SHP	installation-wide safety and health plan
µg/L	micrograms per liter	PDS	Personnel Decontamination Station	SI	site investigation
µmhos/cm	micromhos per centimer	PEL	permissible exposure limit	sm	silty sands; sand-silt mixtures
min	minimum	Pest.	pesticide	SOP	standard operating procedure
MINICAMS	miniature continuous air sampling system	PG	professional geologist	sp	poorly graded sands; gravelly sands
ml	inorganic silts and very fine sands	PID	photoionization detector	SP	sump pump
mL	milliliter	PkA	Philo and Stendal soils local alluvium, 0 to 2 percent slopes	Ss	stony rough land, sandstone series
mm	millimeter	POL	petroleum, oils, and lubricants	SS	surface soil
MOGAS	motor vehicle gasoline	PP	peristaltic pump	SSC	site-specific chemical
MPA	methyl phosphonic acid	ppb	parts per billion	SSHO	site safety and health officer
MR	molasses residue	PPE	personal protective equipment	SSHP	site-specific safety and health plan
MS	matrix spike	ppm	parts per million	SSSL	site-specific screening level
mS/cm	milliSiemens per centimeter	PPMP	Print Plant Motor Pool	STB	supertropical bleach
MSD	matrix spike duplicate	ppt	parts per thousand	STEL	short-term exposure limit
msl	mean sea level	PSSC	potential site-specific chemical	STOLS	Surface Towed Ordnance Locator System <sup>®</sup>
MtD3	Montevallo shaly, silty clay loam, 10 to 40 percent slopes , severely eroded	pt	peat or other highly organic silts	Std. units	standard units
mV	millivolts	PVC	polyvinyl chloride	SU	standard unit
MW	monitoring well	QA	quality assurance	SVOC	semivolatile organic compound
N/A	not applicable; not available	QA/QC	quality assurance/quality control	SW	surface water
NAD	North American Datum	QAP	installation-wide quality assurance plan	SW-846	U.S. EPA <i>Test Methods for Evaluating Solid Waste: Physical/Chemical Methods</i>
NAD83	North American Datum of 1983	QC	quality control	SZ	support zone
NAVD88	North American Vertical Datum of 1988	QST	QST Environmental Inc.	TAL	target analyte list



***List of Abbreviations and Acronyms (Continued)***

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TAT	turn around time
TB	trip blank
TCE	trichloroethene
TCL	target compound list
TCLP	toxicity characteristic leaching procedure
TDGCL	thiodiglycol
TDGCLA	thiodiglycol chloroacetic acid
TERC	Total Environmental Restoration Contract
TIC	tentatively identified compounds
TLV	threshold limit value
TN	Tennessee
TOC	top of casing, total organic carbon
TPH	total petroleum hydrocarbons
TRADOC	U.S. Army Training and Doctrine Command
TRPH	total recoverable petroleum hydrocarbons
TWA	time weighted average
UCL	upper confidence limit
UCR	upper certified range
UJ	not detected above reporting limit; result should be estimated
USACE	U.S. Army Corps of Engineers
USAEC	U.S. Army Environmental Center
USAEHA	U.S. Army Environmental Hygiene Agency
USAMCLS	U.S. Army Chemical School
USATEU	U.S. Army Technical Escort Unit
USATHAMA	U.S. Army Toxic and Hazardous Material Agency
USCS	Unified Soil Classification System
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
UST	underground storage tank
UXO	unexploded ordnance
VOA	volatile organic analyte
VOC	volatile organic compound
VOH	volatile organic hydrocarbon
VQlfr	validation qualifier
VQual	validated qualifier
VX	nerve agent (O-ethyl-S- [diisopropylaminoethyl]-methylphosphonothiolate)
Weston	Roy F. Weston, Inc.
WP	installation-wide work plan
WS	watershed
WSA	Watershed Screening Assessment
WWI	World War I
WWII	World War II
XRF	x-ray fluorescence
yd <sup>3</sup>	cubic yards